**Space Weather Highlights**
**09 April - 15 April 2018**

**SWPC PRF 2224**
**16 April 2018**

Solar activity was at very low levels with a few isolated B-class flares observed.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit was at moderate levels on 09 Apr and high levels on 10-15 Apr. The largest flux of the period was 25,451 pfu observed at 12/2155 UTC.

Geomagnetic field activity was at quiet to active levels from 09-13 Apr due to negative polarity CH HSS effects. An isolated G1 (Minor) storm period was observed early on 11 Apr. Quiet conditions were observed on 14-15 Apr.

The period began with solar wind speeds at about 375 km/s, total field (Bt) at about 3 nT, Bz weakly negative to about -3 nT and the phi angle in a positive orientation. Early on the 9th, an SSBC from a positive to a negative orientation occurred coupled with a CIR in advance of a recurrent, negative polarity CH HSS. Winds speeds gradually increased in near 580 km/s by 11/0700 UTC, Bt peaked at 9 nT on the 11th and the Bz component was variable between +9 nT to -7nT early on 10 Apr. The period ended with wind speeds near 300 km/s coupled with a weak magnetic sturcture.

**Space Weather Outlook**
**16 April - 12 May 2018**

Solar activity is expected to be at very low levels throughout the period.

No proton events are expected at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to be high levels on 16-30 Apr and 07-12 May due to recurrent CH HSS effects. Normal to moderate levels are expected from 01-06 May.

Geomagnetic field activity is expected to be unsettled to active levels on 19-20 Apr and 06-10 May due to recurrent CH HSS effects. Mostly quiet levels are expected for the remainder of the outlook period.

## *Daily Solar Data*

| Date | Radio Flux 10.7cm | Sun spot No. | Sunspot Area ($10^{-6}$ hemi.) | X-ray Background Flux | | Flares | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | X-ray | | | Optical | | | |
| | | | | | | C | M | X | S | 1 | 2 | 3 | 4 |
| 09 April | 69 | 0 | 0 | A0.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10 April | 69 | 0 | 0 | A0.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11 April | 68 | 0 | 0 | A1.2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12 April | 70 | 13 | 30 | A1.9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 13 April | 70 | 14 | 30 | A2.1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 14 April | 70 | 11 | 10 | A1.7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15 April | 71 | 0 | 0 | A1.9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

## *Daily Particle Data*

| Date | Proton Fluence (protons/cm$^2$ -day -sr) | | | Electron Fluence (electrons/cm$^2$ -day -sr) | | |
|---|---|---|---|---|---|---|
| | >1 MeV | >10 MeV | >100 MeV | >0.6 MeV | >2MeV | >4 MeV |
| 09 April | 1.1e+06 | 1.6e+04 | 3.5e+03 | 6.0e+06 | | |
| 10 April | 8.1e+05 | 1.6e+04 | 3.3e+03 | 4.2e+07 | | |
| 11 April | 1.5e+06 | 1.6e+04 | 3.5e+03 | 3.2e+08 | | |
| 12 April | 8.0e+05 | 1.7e+04 | 3.6e+03 | 8.0e+08 | | |
| 13 April | 9.3e+05 | 1.7e+04 | 3.4e+03 | 4.9e+08 | | |
| 14 April | 1.5e+06 | 1.7e+04 | 3.7e+03 | 3.5e+08 | | |
| 15 April | 8.0e+05 | 1.8e+04 | 3.7e+03 | 2.3e+08 | | |

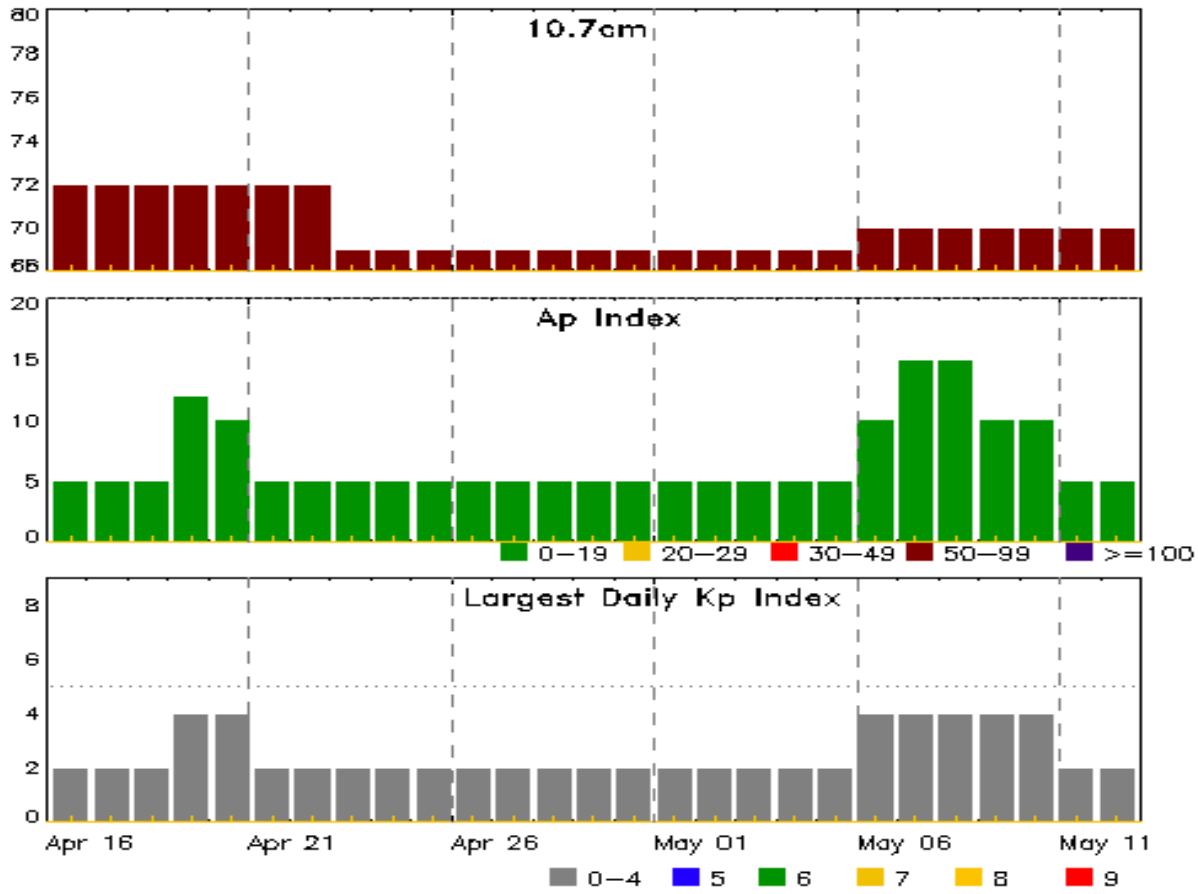
## *Daily Geomagnetic Data*

| Date | Middle Latitude Fredericksburg | | High Latitude College | | Estimated Planetary | |
|---|---|---|---|---|---|---|
| | A | K-indices | A | K-indices | A | K-indices |
| 09 April | 11 | 2-1-3-2-2-2-3-4 | 12 | 1-1-3-3-4-2-2-3 | 11 | 2-1-3-2-2-2-2-4 |
| 10 April | 14 | 2-4-4-2-3-2-2-3 | 34 | 3-4-5-4-6-5-3-3 | 18 | 2-4-4-3-3-3-2-3 |
| 11 April | 12 | 4-3-4-2-2-0-1-2 | 22 | 4-4-6-4-2-1-1-1 | 14 | 5-4-4-2-2-0-1-2 |
| 12 April | 8 | 2-2-3-1-2-2-2-2 | 11 | 2-1-3-4-3-2-1-2 | 9 | 2-2-3-2-2-2-2-3 |
| 13 April | 8 | 3-2-2-2-2-1-2-2 | 9 | 3-2-3-3-3-0-1-1 | 9 | 4-2-2-2-2-1-2-2 |
| 14 April | 6 | 1-1-0-1-3-2-2-2 | 2 | 1-1-0-0-1-1-1-0 | 6 | 2-2-0-1-2-2-2-2 |
| 15 April | 5 | 2-1-1-1-2-1-2-1 | 6 | 1-1-3-2-3-1-0-0 | 9 | 2-2-1-1-2-1-1-2 |

## *Alerts and Warnings Issued*

| Date & Time of Issue UTC | Type of Alert or Warning | Date & Time of Event UTC |
|---|---|---|
| 09 Apr 2131 | WARNING: Geomagnetic K = 4 | 09/2130 - 10/0600 |
| 09 Apr 2152 | ALERT: Geomagnetic K = 4 | 09/2151 |
| 09 Apr 2335 | WARNING: Geomagnetic K = 5 | 09/2335 - 10/0600 |
| 10 Apr 0552 | EXTENDED WARNING: Geomagnetic K = 4 | 09/2130 - 10/1500 |
| 10 Apr 0702 | WARNING: Geomagnetic K = 5 | 10/0702 - 1200 |
| 10 Apr 1353 | EXTENDED WARNING: Geomagnetic K = 4 | 09/2130 - 10/2359 |
| 10 Apr 1832 | ALERT: Electron 2MeV Integral Flux >= 1000pfu | 10/1830 |
| 10 Apr 2354 | EXTENDED WARNING: Geomagnetic K = 4 | 09/2130 - 11/0900 |
| 11 Apr 0135 | WARNING: Geomagnetic K = 5 | 11/0135 - 0600 |
| 11 Apr 0302 | ALERT: Geomagnetic K = 5 | 11/0259 |
| 11 Apr 0855 | EXTENDED WARNING: Geomagnetic K = 4 | 09/2130 - 11/1800 |
| 11 Apr 0859 | CONTINUED ALERT: Electron 2MeV Integral Flux >= 1000pfu | 10/1830 |
| 12 Apr 0742 | WARNING: Geomagnetic K = 4 | 12/0741 - 1200 |
| 12 Apr 0859 | CONTINUED ALERT: Electron 2MeV Integral Flux >= 1000pfu | 10/1830 |
| 13 Apr 0023 | WARNING: Geomagnetic K = 4 | 13/0025 - 0600 |
| 13 Apr 0040 | ALERT: Geomagnetic K = 4 | 13/0040 |
| 13 Apr 0859 | CONTINUED ALERT: Electron 2MeV Integral Flux >= 1000pfu | 10/1830 |
| 14 Apr 0901 | CONTINUED ALERT: Electron 2MeV Integral Flux >= 1000pfu | 10/1830 |
| 15 Apr 1246 | CONTINUED ALERT: Electron 2MeV Integral Flux >= 1000pfu | 10/1830 |

## *Twenty-seven Day Outlook*




| Date | Radio Flux 10.7cm | Planetary A Index | Largest Kp Index | Date | Radio Flux 10.7cm | Planetary A Index | Largest Kp Index |
|---|---|---|---|---|---|---|---|
| 16 Apr | 72 | 5 | 2 | 30 Apr | 69 | 5 | 2 |
| 17 | 72 | 5 | 2 | 01 May | 69 | 5 | 2 |
| 18 | 72 | 5 | 2 | 02 | 69 | 5 | 2 |
| 19 | 72 | 12 | 4 | 03 | 69 | 5 | 2 |
| 20 | 72 | 10 | 4 | 04 | 69 | 5 | 2 |
| 21 | 72 | 5 | 2 | 05 | 69 | 5 | 2 |
| 22 | 72 | 5 | 2 | 06 | 70 | 10 | 4 |
| 23 | 69 | 5 | 2 | 07 | 70 | 15 | 4 |
| 24 | 69 | 5 | 2 | 08 | 70 | 15 | 4 |
| 25 | 69 | 5 | 2 | 09 | 70 | 10 | 4 |
| 26 | 69 | 5 | 2 | 10 | 70 | 10 | 4 |
| 27 | 69 | 5 | 2 | 11 | 70 | 5 | 2 |
| 28 | 69 | 5 | 2 | 12 | 70 | 5 | 2 |
| 29 | 69 | 5 | 2 | | | | |

## *Energetic Events*

| | Time | | | X-ray | | Optical Information | | | Peak Radio Flux | | Sweep Freq Intensity | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | Begin | Max | Half Max | Class | Integ Flux | Imp/ Brtns | Location Lat CMD | Rgn # | 245 | 2695 | II | IV |

**No Events Observed**

## *Flare List*

| | Time | | | | Optical | | |
|---|---|---|---|---|---|---|---|
| Date | Begin | Max | End | X-ray Class | Imp/ Brtns | Location Lat CMD | Rgn # |
| 12 Apr | 0237 | 0245 | 0247 | A9.5 | | | |
| 14 Apr | 0009 | 0012 | 0015 | B1.0 | | | 2704 |
| 14 Apr | 1910 | 1919 | 1930 | B2.4 | | | |
| 15 Apr | 0005 | 0010 | 0024 | B1.4 | | | |
| 15 Apr | 1237 | 1240 | 1243 | B3.5 | | | |
| 15 Apr | 1346 | 1349 | 1354 | B1.0 | | | |

## *Region Summary*

| | Location | | Sunspot Characteristics | | | | | Flares | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Helio | Area | Extent | Spot | Spot | Mag | X-ray | | | Optical | | | | |
| Date | Lat CMD | Lon | $10^{-6}$ hemi. | (helio) | Class | Count | Class | C | M | X | S | 1 | 2 | 3 | 4 |
| | | ***Region 2703*** | | | | | | | | | | | | | |
| 30 Mar | S08E60 | 192 | 10 | 1 | Axx | 1 | A | 1 | | | 4 | | | | |
| 31 Mar | S08E47 | 193 | 10 | 2 | Axx | 2 | A | | | | 1 | | | | |
| 01 Apr | S08E34 | 193 | plage | | | | | | | | 1 | | | | |
| 02 Apr | S08E20 | 194 | plage | | | | | | | | | | | | |
| 03 Apr | S08E06 | 195 | plage | | | | | | | | 3 | | | | |
| 04 Apr | S08W08 | 196 | plage | | | | | | | | | | | | |
| 05 Apr | S08W22 | 197 | plage | | | | | | | | | | | | |
| 06 Apr | S08W36 | 197 | plage | | | | | | | | | | | | |
| 07 Apr | S08W50 | 198 | plage | | | | | | | | | | | | |
| 08 Apr | S08W64 | 199 | plage | | | | | | | | | | | | |
| 09 Apr | S08W78 | 200 | plage | | | | | | | | | | | | |
| 10 Apr | S08W92 | 201 | plage | | | | | | | | | | | | |
| | | | | | | | | 1 | 0 | 0 | 9 | 0 | 0 | 0 | 0 |

Crossed West Limb.
Absolute heliographic longitude: 195

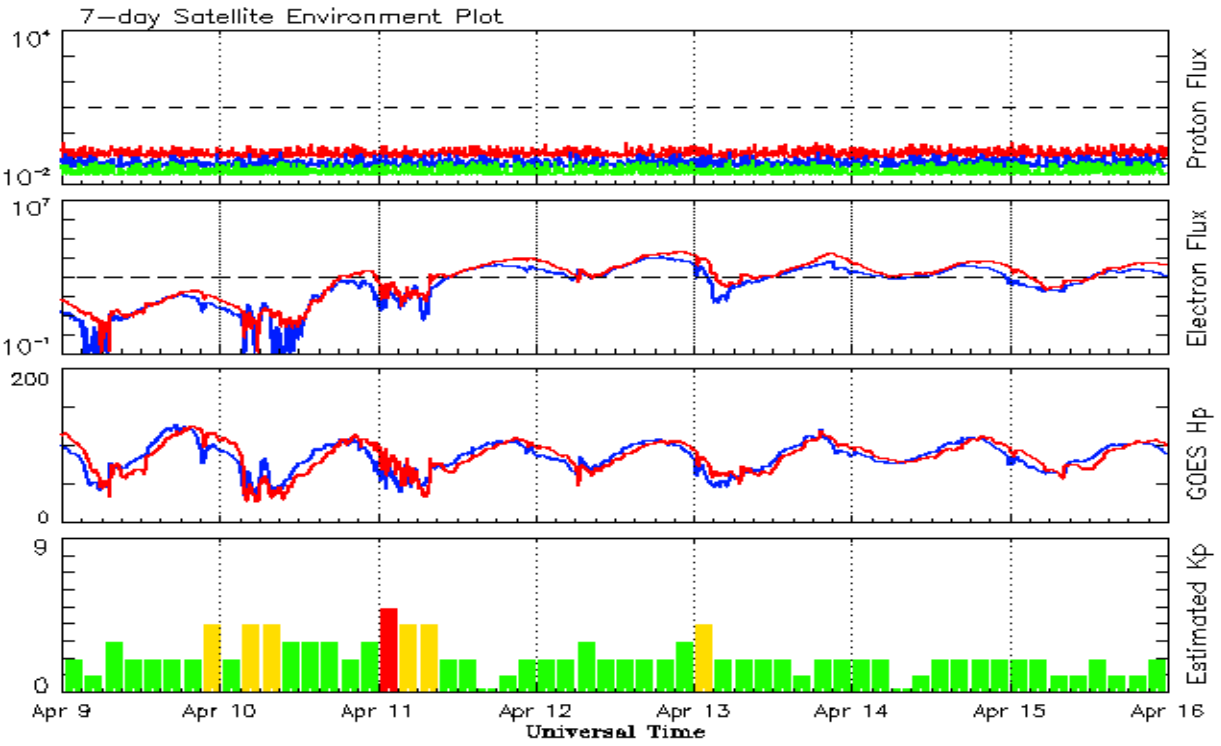
| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ***Region 2704*** | | | | | | | | | | | | | |
| 12 Apr | N10E51 | 30 | 30 | 2 | Bxo | 3 | B | | | | | | | | |
| 13 Apr | N12E36 | 33 | 30 | 3 | Bxo | 4 | B | | | | | | | | |
| 14 Apr | N12E24 | 31 | 10 | | Axx | 1 | A | | | | | | | | |
| 15 Apr | N12E10 | 33 | plage | | | | | | | | | | | | |
| | | | | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Still on Disk.
Absolute heliographic longitude: 33

## *Recent Solar Indices (preliminary)*
## *Observed monthly mean values*

| | Sunspot Numbers | | | | | Radio Flux | | Geomagnetic | |
|---|---|---|---|---|---|---|---|---|---|
| | Observed values | | Ratio | Smooth values | | Penticton | Smooth | Planetary | Smooth |
| Month | SEC | RI | RI/SEC | SEC | RI | 10.7 cm | Value | Ap | Value |
| | | | | ***2016*** | | | | | |
| April | 39.2 | 22.7 | 0.58 | 45.0 | 28.7 | 93.4 | 95.3 | 10 | 11.8 |
| May | 48.9 | 30.9 | 0.64 | 42.1 | 26.9 | 93.1 | 93.2 | 12 | 11.7 |
| June | 19.3 | 12.3 | 0.65 | 39.0 | 24.9 | 81.9 | 90.4 | 9 | 11.4 |
| July | 36.8 | 19.4 | 0.53 | 36.5 | 23.1 | 85.9 | 87.7 | 10 | 11.2 |
| August | 50.4 | 30.1 | 0.60 | 34.2 | 21.6 | 85.0 | 85.5 | 10 | 11.2 |
| September | 37.4 | 26.8 | 0.72 | 32.1 | 19.9 | 87.8 | 83.7 | 16 | 11.3 |
| October | 30.0 | 20.0 | 0.67 | 31.1 | 18.9 | 86.1 | 82.5 | 16 | 11.6 |
| November | 22.4 | 12.8 | 0.57 | 29.4 | 17.9 | 78.7 | 81.1 | 10 | 11.6 |
| December | 17.6 | 11.1 | 0.64 | 28.1 | 17.1 | 75.1 | 80.0 | 10 | 11.4 |
| | | | | ***2017*** | | | | | |
| January | 28.1 | 15.7 | 0.55 | 27.3 | 16.7 | 77.4 | 79.4 | 10 | 11.3 |
| February | 22.0 | 15.8 | 0.71 | 25.5 | 15.9 | 76.9 | 78.7 | 10 | 11.3 |
| March | 25.4 | 10.6 | 0.42 | 24.6 | 15.4 | 74.6 | 78.6 | 15 | 11.5 |
| April | 30.4 | 19.4 | 0.64 | 24.3 | 14.9 | 80.9 | 78.4 | 13 | 11.5 |
| May | 18.1 | 11.3 | 0.62 | 23.1 | 14.0 | 73.5 | 77.7 | 9 | 11.3 |
| June | 18.0 | 11.5 | 0.64 | 22.0 | 13.3 | 74.8 | 77.3 | 7 | 11.3 |
| July | 18.8 | 10.7 | 0.59 | 20.8 | 12.6 | 77.7 | 76.8 | 9 | 11.0 |
| August | 25.0 | 19.6 | 0.80 | 19.7 | 11.7 | 77.9 | 76.3 | 12 | 10.7 |
| September | 42.2 | 26.2 | 0.62 | 18.6 | 10.9 | 92.0 | 75.9 | 19 | 10.3 |
| October | 16.0 | 7.9 | 0.49 | | | 76.4 | | 11 | |
| November | 7.7 | 3.4 | 0.44 | | | 72.1 | | 11 | |
| December | 7.6 | 4.9 | 0.64 | | | 71.5 | | 8 | |
| | | | | ***2018*** | | | | | |
| January | 7.8 | 4.0 | 0.51 | | | 70.0 | | 6 | |
| February | 16.0 | 6.4 | 0.40 | | | 72.0 | | 7 | |
| March | 6.0 | 1.5 | 0.25 | | | 68.4 | | 8 | |

**Note:** Values are final except for the most recent 6 months which are considered preliminary. Cycle 24 started in Dec 2008 with an RI=1.7.




*Weekly Geosynchronous Satellite Environment Summary*
*Week Beginning 09 April 2018*

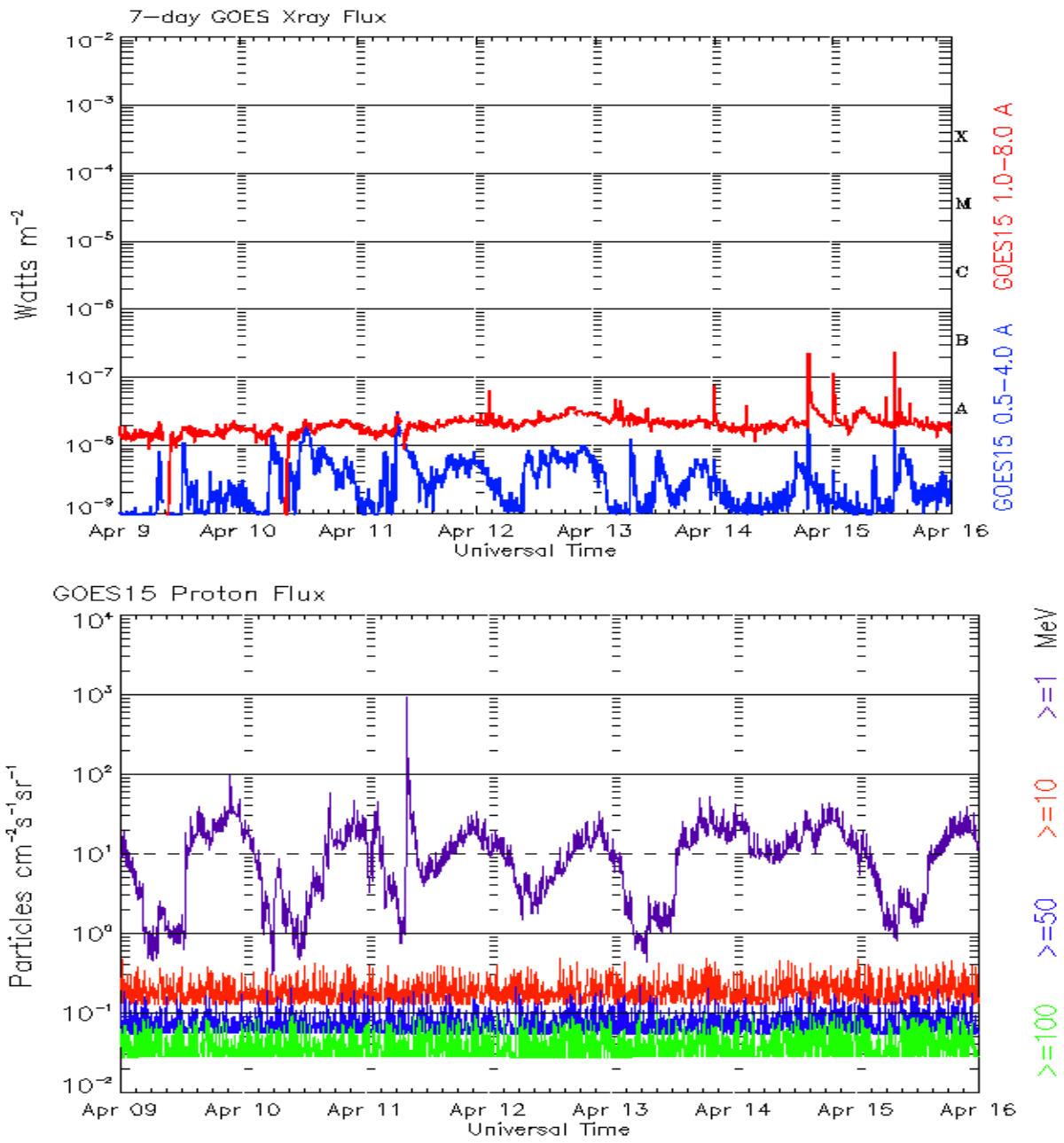
The proton flux plot contains the five-minute averaged integral proton flux (protons/cm$^2$-sec -sr) as measured by the SWPC Primary GOES satellite, near West 75, for each of three energy thresholds: greater than 10, 50, and 100 MeV.

The electron flux plot contains the five-minute averaged integral electron flux (electrons/cm$^2$-sec -sr) with energies greater than 2 MeV by the SWPC Primary GOES satellite.

The Hp plot contains the five minute averaged Hp magnetic field component in nanoteslas (nT) as by the SWPC Primary GOES satellite. The Hp component is parallel to the spin axis of the satellite, which is nearly parallel to the Earth's rotation axis.

The Estimated 3-hour Planetary Kp-index is derived at the NOAA Space Weather Prediction Center using data from the following ground-based magnetometers: Boulder, Colorado; Chambon la Foret, France; Fredericksburg, Virginia; Fresno, California; Hartland, UK; Newport, Washington; Sitka, Alaska. These data are made available thanks to the cooperative efforts between SWPC and data providers around the world, which currently includes the U.S. Geological Survey, the British Geological Survey, and the Institut de Physique du Globe de Paris.

The data included here are those now available in real time at the SWPC and are incomplete in that they do not include the full set of parameters and energy ranges known to cause satellite operating anomalies. The proton and electron fluxes and Kp are 'global' parameters that are applicable to a first order approximation over large areas. H parallel is subject to more localized phenomena and the measurements generally are applicable to within a few degrees of longitude of the measuring satellite.




*Weekly GOES Satellite X-ray and Proton Plots*
*Week Beginning 09 April 2018*

The x-ray plots contains five-minute averages x-ray flux (Watt/m$^2$) as measure by the SWPC primary GOES X-ray satellite, usually at West 105 longitude, in two wavelength bands, 0.05 - 0.4 and 0.1 - 0.8 nm. The letters A, B, C, M and X refer to x-ray event levels for the 0.1 - 0.8 nm band.

The proton plot contains the five-minute averaged intergral flux units (pfu = protons/cm$^2$ -sec -sr) as measured by the primary SWPC GOES Proton satellite for each of the energy thresholds: >1, >10, >30, and >100 MeV. The P10 event threshold is 10 pfu at greater than 10 MeV.

## *Preliminary Report and Forecast of Solar Geophysical Data (The Weekly)*

Published every Monday by the Space Weather Prediction Center.

U.S. Department of Commerce
NOAA / National Weather Service
Space Weather Prediction Center
325 Broadway, Boulder CO 80305

**Notice:** The 27-day Outlook, Satellite Environment, X-ray and Proton plots have been redesigned. Comments and suggestions are welcome SWPC.Webmaster@noaa.gov

The Weekly has been published continuously since 1951 and is available online since 1997.

http://spaceweather.gov/weekly/ -- Current and previous year
http://spaceweather.gov/ftpmenu/warehouse.html -- Online achive from 1997
http://spaceweather.gov/ftpmenu/ -- Some content as ascii text
http://spaceweather.gov/SolarCycle/ -- Solar Cycle Progression web site

http://spaceweather.gov/contacts.html -- Contact and Copyright information
http://spaceweather.gov/weekly/Usr_guide.pdf -- User Guide